

## CHAPTER 7. HIGH INTENSITY FLASHING WHITE LIGHTING SYSTEMS STANDARDS

### 70. PURPOSE.

Lighting with high intensity (L-856) flashing white obstruction lights provides the highest degree of conspicuity both day and night.

### 71. STANDARDS.

When high intensity white lights are operated 24 hours a day, other methods of marking and lighting may be omitted. This systems should not be recommended on structures 500 feet (153m) AGL or less unless an FAA aeronautical study shows otherwise.

### 72. CONTROL DEVICE.

The light intensity is controlled by a device that changes the intensity when the ambient light changes. The system should automatically change intensity steps when the northern sky illumination in the Northern Hemisphere on a vertical surface is as follows:

**a. Day-to-Twilight.** This should not occur before the illumination drops to 60 footcandles (645.8 lux), but should occur before it drops below 35 footcandles (376.7 lux). The illuminance sensing device should, if practical, face the northern sky in the Northern Hemisphere.

**b. Twilight-to-Night.** This should not occur before the illumination drops below five footcandles (53.8 lux), but should occur before it drops below two footcandles (21.5 lux).

**c. Night-to-Day.** The intensity changes listed in (a) and (b) above should be reversed when changing from the night to day mode.

### 73. UNITS PER LEVEL.

One or more light units is needed to obtain the desired horizontal coverage. The number of light units recommended per level (except for the supporting structures of catenary wires and buildings) depends upon the average outside diameter of the specific structure, and the horizontal beam width of the light fixture. The light units should be installed in a manner to ensure an unobstructed view of the system by a pilot approaching from any direction. The number of lights recommended are the minimum. ( See APPENDIX 1. ) When the structure diameter is:

**a. 20 Feet (6m) or Less.** Three light units per level.

**b. Exceeding 20 Feet (6m) But Not More Than 100 Feet (31m).** Four light units per level.

**c. Exceeding 100 Feet (31m).** Six light units per level.

### 74. INSTALLATION GUIDANCE.

Manufacturing specifications provide for the effective peak intensity of the light beam to be adjustable from zero to 8 degrees above the horizon. Normal installation should place the top light at zero degrees to the horizontal and all other light units installed in accordance with TBL 2:

Light Unit Elevation Above the Horizontal

Height of Light Unit Above Terrain	Degrees of Elevation Above the Horizontal
Exceeding 500 feet AGL	0
401 feet to 500 feet AGL	1
301 feet to 400 feet AGL	2
300 feet AGL or less	3

TBL 2

**a. Vertical Aiming.** Where terrain, nearby residential areas, or other situations dictate, the light beam may be further elevated above the horizontal. The main beam of light at the lowest level should not strike the ground closer than 3 statute miles (5km) from the structure. If additional adjustments are necessary, the lights may be individually adjusted upward, in 1 degree increments, starting at the bottom. Excessive elevation may reduce its conspicuity by raising the beam above a collision course flight path.

**b. Special Cases.** Where lighting systems are installed on structures located near highways, waterways, airport approach areas, etc., caution should be exercised to ensure that the lights do not distract or otherwise cause a hazard to motorists, vessel operators, or pilots on an approach to an airport. In these cases, shielding or an adjustment to the vertical or horizontal light aiming may be necessary. This adjustment should not derogate the intended purpose of the lighting system. Such adjustments may require review action as described in CHAPTER 1. , paragraph 5. (Also see CHAPTER 4. , paragraph 49.)

**c. Relocation or Omission of Light Units.** Light units should not be installed in such a manner that the light pattern/output is disrupted by the structure.

**1. Lowest Level.** The lowest level of light units may be installed at a higher elevation than normal on a structure if the surrounding terrain, trees, or adjacent building(s) would obscure the lights. ( See APPENDIX 1. ) In certain instances, as determined by an FAA aeronautical study, the lowest level of lights may be eliminated.

**2. Two Adjacent Structures.** Where two structures are situated within 500 feet (153m) of each other and the light units are installed at the same levels, the sides of the structures facing each other need not be lighted. However, all lights on both structures must flash simultaneously, except for adjacent catenary support structures. Adjust

vertical placement of the lights to either or both structures' intermediate levels to place the lights on the same horizontal plane. Where one structure is higher than the other, complete level(s) of lights should be installed on that part of the higher structure which extends above the top of the lower structure. If the structures are of such heights that the levels of lights cannot be placed in identical horizontal planes, then the light units should be placed such that the center of the horizontal beam patterns do not face toward the adjacent structure. For example, structures situated north and south of each other should have the light units on both structures installed on a northwest/southeast and northeast/southwest orientation. ( See APPENDIX 1. )

**3. Three or More Adjacent Structures.** The treatment of a cluster of structures as an individual or a complex of structures will be determined by the FAA as the result of an aeronautical study, taking into consideration the location, heights, and spacing with other structures.

## 75. ANTENNA OR SIMILAR APPURTENANCE LIGHT.

When a structure lighted by a high intensity flashing light system is topped with an antenna or similar appurtenance exceeding 40 feet (12m) in height, a medium intensity flashing white light (L-865) should be placed within 40 feet (12m) from the tip of the appurtenance. This light should operate 24 hours a day and flash simultaneously with the rest of the lighting system.

## 76. CHIMNEYS, FLARE STACKS, AND SIMILAR SOLID STRUCTURES.

The number of light levels depends on the height of the structure excluding appurtenances. Three or more lights should be installed on each level in such a manner to ensure an unobstructed view by the pilot. Normally, the top level is on the highest point of a structure. However, the top level of chimney lights may be installed as low as 20 feet (6m) below the top to minimize deposit build-up due to emissions.

## 77. RADIO AND TELEVISION TOWERS AND SIMILAR SKELETAL STRUCTURES.

**a. Mounting Lights.** The number of levels recommended depends on the height of the structure, excluding antennas and similar appurtenances. At least three lights should be installed on each level and mounted to ensure that the effective intensity of the full horizontal beam coverage is not impaired by the structural members.

**b. Top Level.** One level of lights should be installed at the highest point of the structure. If the highest point is a rod or antenna incapable of supporting a lighting system then the top level of lights should be installed at the highest portion of the main skeletal structure. When guy wires come together at the top, it may be necessary to install this level

of lights as low as 10 feet (3m) below the top. If the rod or antenna exceeds 40 feet (12m) above the main structure, a medium intensity flashing white light (L-865) should be mounted on the highest point. If the appurtenance (such as a whip antenna) is incapable of supporting a medium intensity light, one or more lights should be installed on a pole adjacent to the appurtenance. Adjacent installation should not exceed the height of the appurtenance and be within 40 feet (12m) of the tip to allow an unobstructed view of at least one light. (See paragraph 75.)

**c. Ice Shields.** Where icing is likely to occur, metal grates or similar protective ice shields should be installed directly over each light unit to prevent falling ice or accumulations from damaging the light units.

## 78. HYPERBOLIC COOLING TOWERS.

Light units should be installed in a manner to ensure an unobstructed view of at least two lights by a pilot approaching from any direction. ( See APPENDIX 1. )

**a. Number of Light Units.** The number of units recommended depends on the diameter of the structure at the top. The number of lights recommended in the following table are the minimum. When the structure diameter is:

**1. 20 Feet (6m) or Less.** Three light units per level.

**2. Exceeding 20 Feet (6m) But Not More Than 100 Feet (31m).** Four light units per level.

**3. Exceeding 100 Feet (31m) But Not More Than 200 Feet (61m).** Six light units per level.

**4. Exceeding 200 Feet (61m).** Eight light units per level.

**b. Structures Exceeding 600 Feet (183m) AGL.** Structures exceeding 600 feet (183m) AGL should have a second level of light units installed approximately at the midpoint of the structure and in a vertical line with the top level of lights.

## 79. PROMINENT BUILDINGS AND SIMILAR EXTENSIVE OBSTRUCTIONS.

When objects within a group of obstructions are approximately the same overall height above the surface and are located not more than 150 feet (46m) apart, the group of obstructions may be considered an extensive obstruction. Install light units on the same horizontal plane at the highest portion or edge of prominent obstructions. Light units should be placed to ensure that the light is visible to a pilot approaching from any direction. These lights may require shielding, such as louvers, to ensure minimum adverse impact on local communities. Extreme caution in the use of high intensity flashing white lights should be exercised.

**a. If the Obstruction is 200 feet (61m) or Less in Either Horizontal Dimension,** install three or more light units at the highest portion of the structure in a manner to ensure that

at least one light is visible to a pilot approaching from any direction. Units may be mounted on a single pedestal at or near the center of the obstruction. If light units are placed more than 10 feet (3m) from the center point of the structure, use a minimum of four units.

**b. If the Obstruction Exceeds 200 Feet (61m) in One Horizontal Dimension,** but is 200 feet (61m) or less in the other, two light units should be placed on each of the shorter sides. These light units may either be installed adjacent to each other at the midpoint of the edge of the obstruction or

at (near) each corner with the light unit aimed to provide 180 degrees of coverage at each edge. One or more light units should be installed along the overall length of the major axis. These lights should be installed at approximately equal intervals not to exceed a distance of 100 feet (31m) from the corners or from each other.

**c. If the Obstruction Exceeds 200 Feet (61m) in Both Horizontal Dimensions,** light units should be equally spaced along the overall perimeter of the obstruction at intervals of 100 feet (31m) or fraction thereof.